

REMARKS

Applicant has carefully reviewed the office action of notification date May 1, 2008. The present response is meant to be responsive to all points of the office action. Favorable reconsideration and allowance is hereby solicited.

Applicant herein amends claims 1, 5, 6, 18, 19, 27, 33, 34, 43, 46 and 47, cancels claims 7 and 8 without prejudice, and presents new claims 48 – 50. Support for the amendments is found in the originally filed specification and claims. No new matter is added by these amendments. Claims 1 – 6 and 9 - 50 remain in the case.

CLAIM REJECTIONS – 35 USC §112

A. Claims 18, 19 and 46 – 47 stand rejected under 35 U.S.C. 112, second paragraph as being indefinite. Applicant has amended claims 18 and 19 to more clearly recite that the combiner is operative to transmit a signal to at least one of the power sources indicating that the combiner is operative to produce high power. The duplicate word "that" of claim 18 has been deleted. Claims 46 and 47 have been amended to more clearly recite that the method comprises transmitting a signal to at least one of the power sources notifying the power source of the combining.

B. Claims 7 and 8 have been cancelled without prejudice.

CLAIM REJECTIONS 35 USC 103

C. Applicant is aware of the obligation under 37 CFR 1.56, and states that the claims were and are commonly owned.

D. Claims 1 – 6, 9 – 16, 18 – 35, 43 and 46 – 47 stand rejected under 35 USC 103(a) as being unpatentable over Admitted Prior Art (APA) in view of Elkayam (US 2003/0099076) and Ross '503 (U.S. 4,159,503). APA describes powering of a powered device from a power sourcing equipment (PSE), located alternatively in the hub or a midspan. Communication cabling connects the hub and the powered device, optionally via the midspan, and presents a single round trip path between a single powered device and a single PSE. The

communication cabling is arranged so that a single PSE may be attached to either one of two sets of twisted wire pairs.

Elkayam teaches a LAN comprising a redundant power supply. The redundant power supply feeds power to a power supply on a main power supply board which is operative to supply a remote powered device over communication cabling. Elkayam does not teach "a LAN comprising first and second power sources (34, 36), *each powering various loads* (Fig. 2)" as stated by the examiner. Instead, and as will be explained further, Elkayam teaches a LAN comprising a first and second power source, feeding a single power sourcing equipment. The powered device loads are fed from the single power sourcing equipment. In particular, the power distribution and control circuitry (56) is preferably adapted to receive at least one of the regulated power and the redundant regulated power (paragraph 0019). In detail, power supply 50 is implemented to switch between line connection 34 and RPS 36. Power distribution and control circuitry 56 *receives the 48V DC from connector 40 and delivers it to board 14. Board 48 most preferably comprises power over LAN support circuitry 55, which couples it to each connector 24 so that each cable 32 is able to convey both communication data and power to a respective device 32.* (paragraphs 0073 – 0075).

In summary, Elkayam teaches supplying a redundant power supply to support the PSE of APA. The PSE of APA does not typically generate power independently, but instead receives its power from an external source, and in the case of Elkayam from redundant sources. The PSE of APA is none other than the power distribution and control circuitry (56) of Elkayam.

Ross '503 teaches a combiner for alternating current, in which the voltages of the alternating current are added to make available power at double voltage. Additionally, Ross '320 (US 3,991,320 to Ross), listed on the attached Information Disclosure Statement, teaches a combiner for alternating current arranged to channel and combine the power from separate input connectors into a single combiner output to make available power up to at least double the prescribed maximum available from each separate branch outlet at either twice nominal voltage and up to the maximum prescribed current or up to two or more times the maximum prescribed current (col 2, ln 4 – 10).

Independent claim 1, as amended, recites a first and a second direct current power source, each connected to supply power over a unique set of wire pairs of a common communication cabling, in contrast to APA and Elkayam in which only a single power source is provided for each powered device, the single power source being arranged to deliver power over a single set of wire pairs.

In contrast to Ross '503, a) the currents of the received power are added, and not the voltages; b) the currents are direct currents and not alternating currents; and c) the powers are each delivered over separate sets of wire pairs of a common communication cabling. Ross '503 adds voltages, currents are not added, and power is delivered exclusively over branch line circuits of opposing phase.

In contrast to Ross '320, a) the powers are each delivered over separate sets of wire pairs of a common communication cabling; b) the currents are direct currents and not alternating currents; and c) the combiner of amended claim 1 is operative to maintain a near even balance between the current of the received powers. Ross '320 does not concern himself with an imbalance between the currents delivered over the separate branch line circuit, provided that current does not exceed the limits of respective fusing means 118, 119. Thus, for example conductor 16 may carry up to the limit of fusing means 118, while conductor 117 may carry half the limit, without any control by Ross. This is in clear contradistinction to claim 1 of the subject invention in which near even balance between the currents is positively recited.

The combination of APA, Elkayam and Ross can not teach what none of them teaches. The prior art references must teach or suggest *all the claimed limitations*. *In re Royka*, 490 F.2d 981,180 USPQ 580 (CCPA 1974) and MPEP 2143.

Claim 1 is thus deemed patentable over the combination of APA, Elkayam and Ross. Claims 2 – 6, 9 – 16 and 18 – 26 are deemed patentable at least for depending from patentable claim 1. Claim 17 is deemed patentable at least for depending on patentable claim 1.

E. Claims 5 and 6 have been amended to positively recite that the isolation, or lack thereof, is electrical isolation determined at the outputs of the respective first and second

power sources. Newly presented claims 48 and 49 detail certain aspects of the combiner associated with maintaining the near even balance of claim 1.

F. Claims 18 and 19 as amended are additionally patentable, as the prior art does not teach signaling the power sources that the combiner is operative to produce the high power output, nor the details of signaling by change the class identification. Elkayam does not signal the power source of the successful production of high power because: a) no high power is produced by combining first and second powers ; and b) Elkayam "receives regulated power and generates therefrom respective output voltages for supply to the powered devices" (abstract). Elkayam does not "identify the output voltage necessary before supplying the output to the powered device" as indicated by the examiner. Instead, "power distribution and control circuitry 56 receives the 48V DC level from connector 40 and delivers it via the connector to board 14. Board 14 most preferably comprises power over LAN support circuitry 55, *which receives the 48V DC level and which couples it, typically via components such as fuses and the center-taps of data transformers, to each connector with connector 24 so that each cable 32 is able to convey both communication data and power to a respective device 32.*" (Paragraph 0075). The parameters of Table I are further illustrative, in which only current levels, and associated times are monitored. Elkayam passes a fixed voltage supplied at its input, subject to detection and certain current limitations, to the powered device. There is simply no signaling of any combining action on the part of the powered device to the power source.

G. Claims 24 - 26 are additionally patentable as in the absence of a signal to the load, the load will attempt to draw more power than is available, resulting in overload of the power source, or shut down of the load. In the absence of an arrangement wherein the load is responsive to the combiner, as recited in claim 24, and/or wherein the combiner signals the load as recited in claim 26, the load will not be operative in the appropriate mode.

The examiner's contention that "if a load is being supplied with low power it will operate in a low power mode" is not correct. In reality, overloads caused by a load attempting to draw power in excess of a supply limit are a daily occurrence. This is because the load is being supplied with a low power while attempting to draw a higher power – the load is simply unaware of the power limit. Elkayam, APA and Ross do not discuss communication from a combiner to the load. In particular, in contradistinction to examiner's

contention, Elkayam does not "identify and determine the output voltage required for the powered device and the power sources and combiner respond accordingly". Firstly, Elkayam does not have a combiner. Secondly, Elkayam accomplishes detection to determine the existence of a valid device (paragraph 0076). The prior art, notably IEEE 802.3af-2003, teaches classification, in which the power requirements of the powered device are communicated to the power sourcing equipment from the powered device. However this communication is unidirectional – i.e. from the powered device to the power sourcing equipment (although the communication is instigated by the power sourcing equipment). There is no forward communication – i.e. the power sourcing equipment, or a combiner at the powered device end, does not communicate available power limits to a powered device.

H. Independent claim 27, as amended, recites a combiner arranged to receive a first power signal over a twisted wire pair utilized to carry communication data, and a second power over a second set of twisted wire pairs. The combiner further comprises a circuitry arranged to combine the currents of the received powers and maintain a near even balance between the currents of the received powers.

The above is in contrast with APA and Elkayam in which only a single power is delivered over a single set of twisted wire pairs.

In contrast to Ross '503, a) the currents of the received power are added, and not the voltages; and b) the powers are each delivered over a twisted wire pair. Ross '503 adds voltages, the currents are not added, and power is delivered exclusively over branch line circuits of opposing phase.

In contrast to Ross '320, a) the powers are each delivered over a twisted pair communication cabling; and b) the control circuitry is arranged to maintain a near even balance between the current of the received powers. Ross '320 does not concern himself with an imbalance between the currents delivered over the separate branch line circuit, provided that current does not exceed the limits of respective fusing means 118, 119. Thus, for example conductor 16 may carry up to the limit of fusing means 118, while conductor 117 may carry half the limit, without any control by Ross. This is in clear contradistinction to

claim 27 of the subject invention in which near even balance between the currents is positively recited.

The combination of APA, Elkayam and Ross can not teach what none of them teaches. The prior art references must teach or suggest *all the claimed limitations*. *In re Royka*, 490 F.2d 981,180 USPQ 580 (CCPA 1974) and MPEP 2143.

Claim 27 is thus deemed patentable over the combination of APA, Elkayam and Ross. Claims 28 – 35 are deemed patentable at least for depending on patentable claim 27.

I. Claim 34 is additionally patentable as in the absence of a signal to the load, the load will attempt to draw more power than is available, resulting in overload of one or more of the combiner or power source, or shut down of the load. Simply put, in the absence of a signal from the combiner to the powered device the load will not be operative in the appropriate mode.

The examiner's contention that "if a load is being supplied with low power it will operate in a low power mode" is not correct. In reality, overloads caused by a load attempting to draw power in excess of a supply limit are a daily occurrence. This is because the load is being supplied a low power while attempting to draw a higher power – the load is simply unaware of the power limit. Elkayam, APA and Ross do not discuss communication from a combiner to the load. In particular, in contradistinction to examiner's contention, Elkayam does not "identify and determine the output voltage required for the powered device and the power sources and combiner respond accordingly". Firstly, Elkayam does not have a combiner. Secondly, Elkayam accomplishes detection to determine the existence of a valid device (paragraph 0076). The prior art, notably IEEE 802.3af-2003, teaches classification, in which the power requirements of the powered device are communicated to the power sourcing equipment from the powered device. However this communication is unidirectional – i.e. from the powered device to the power sourcing equipment (although the communication is instigated by the power sourcing equipment). There is no forward communication – i.e. the power sourcing equipment, or a combiner at the powered device end, does not communicate available power limits to a powered device.

J. Independent claim 43, as amended, recites a method of supplying power to a powered device comprising: receiving a first power signal over a twisted wire pair and a second power signal over a second twisted wire pair; combining the currents of the received power signals; and maintaining a near even balance between the currents.

The above is in contrast with APA and Elkayam in which only a single power is received over a single set of twisted wire pairs.

In contrast to Ross '503, a) the currents of the received power are added, and not the voltages; and b) the powers are each delivered over a twisted wire pair. Ross '503 adds voltages, the currents are not added, and power is delivered exclusively over branch line circuits of opposing phase.

In contrast to Ross '320, a) the powers are each delivered over a twisted wire pair; and b) a near even balance is maintained between the current of the received powers. Ross '320 does not concern himself with an imbalance between the currents delivered over the separate branch line circuit, provided that current does not exceed the limits of respective fusing means 118, 119. Thus, for example conductor 16 may carry up to the limit of fusing means 118, while conductor 117 may carry half the limit, without any control by Ross. This is in clear contradistinction to claim 43 of the subject invention in which maintaining a near even balance between the currents is positively recited.

The combination of APA, Elkayam and Ross can not teach what none of them teaches. The prior art references must teach or suggest *all the claimed limitations*. *In re Royka*, 490 F.2d 981,180 USPQ 580 (CCPA 1974) and MPEP 2143.

Claim 43 is thus deemed patentable over the combination of APA, Elkayam and Ross. Claims 46 – 47 are deemed patentable at least for depending on patentable claim 43.

K. Claims 46 and 47 as amended are additionally patentable, as the prior art does not teach signaling at least one of the power sources that the combiner is operative to produce the high power output, nor the details of signaling by changing the class identification. Elkayam does not signal the power source of the successful production of high power because: a) no high power is produced by combining first and second powers ; and b) Elkayam "receives regulated power and generates therefrom respective output voltages for supply to the

powered devices" (abstract). Elkayam does not "identify the output voltage necessary before supplying the output to the powered device" as indicated by the examiner. Instead, "power distribution and control circuitry 56 receives the 48V DC level from connector 40 and delivers it via the connector to board 14. Board 14 most preferably comprises power over LAN support circuitry 55, *which receives the 48V DC level and which couples it, typically via components such as fuses and the center-taps of data transformers, to each connector with connector 24 so that each cable 32 is able to convey both communication data and power to a respective device 32.*" (Paragraph 0075). The parameters of Table I are further illustrative, in which only current levels, and associated times are monitored. Elkayam passes a fixed voltage supplied at its input, subject to detection and certain current limitations, to the powered device. There is simply no signaling of any action on the part of the powered device to the power source.

L. Claims 36 – 42 stand rejected under 35 USC 103(1) as being unpatentable over the combination of APA, Elkayam, Ross '503 and Larner (U.S. 4,028,559).

Claims 36 – 42 are deemed patentable at least for ultimately depending on patentable claim 27. Additionally, Larner does not teach a DC/DC converter as contended by the examiner. Larner specifically rejects the use of a d.c. to d.c. converter, as being both complex and unreliable (col. 1 line 56 – 60). Larner teaches converting a single fixed direct current to a series of pulses exhibiting a desired voltage swing. Larner does not combine a first power and a second power – the only power in Larner is the current I (typically standardized at a constant current of 50 milliamps – col. 1 ln 20 – 24). Additionally, Larner does not meet the definition of a DC/DC converter – namely "a circuit which converts a source of direct current from one voltage level to another". There is simply no defined first voltage level, only a fixed current. None of the prior art cited show a circuitry arranged to combine which comprises at least one DC/DC converter as recited by claim 27.

Claim 37 is further patentable, as none of the prior art cited teaches a first DC/DC converter associated with the first power input and a second DC/DC converter associated with the second power input. Even accepting the examiner's argument that Larner is a DC/DC converter (which we do not accept), there is clearly no first DC/DC converter

associated with a first power input and a second DC/DC converter associated with a second power input. There is only one power input.

Claim 38 and 39 are further patentable, as Larner teaches neither a parallel arrangement nor a series arrangement of DC/DC converters. As explained above, Larner specifically does not teach a DC/DC converter. Even accepting the examiner's argument that Larner is a DC/DC converter (which we do not accept), there is clearly no first and second DC/DC converter to be put in series or in parallel.

Claim 40 is further deemed patentable, as Larner does not show a PWM/resonance controller. SW1 and SW2 are simply not PWM/resonance controllers – they are simple repeaters, i.e. output pulse generating transistors (col. 2 ln 24 – 28) and thus do not meet any definition of pulse width modulation or resonance controllers.

Claim 41 is further deemed patentable, as Larner does not teach a first primary associated with a first power input and a second primary associated with a second power input. Larner only receives a single fixed current source ("same power feed current I" – col. 3 ln 3 – 6) – there is simply no first and second power inputs, and certainly no first and second power inputs received over different sets of wire pairs as recited by claim 41.

Claim 42 is further deemed patentable, as Larner does not teach a combined high power output associated with the secondary. The output of Larner is at a higher voltage swing, however Larner does not deliver a power signal, much less a combined a high power output, only a large voltage swing communication signal (col. 1 line 40 – 60).

M. Applicant thanks the examiner for accepting the patentability of claims 44 and 45.

CONCLUSION

In view of the foregoing, allowance of all pending claims (i.e., Claims 1 – 6 and 8 – 50) is respectfully requested.

The Examiner is encouraged to contact Applicant's undersigned agent by telephone if it would in any way aid in the advancement of this application to issue.

Respectfully submitted,

Dated: May 12, 2008

/Simon Kahn/
Simon Mark Kahn
Reg. No. 48,249
Director of Intellectual Property
Microsemi Corp. – AMSG Ltd.

Tel: 1-703-486-1150

Fax: 1-703-892-4510